Application Number: 10/517,674
Amendment Dated: June 4, 2007
Reply to Office Action Dated January 4, 2007

AMENDMENTS TO THE SPECIFICATION

Please replace the current Equation (8) on page 11, line 9 with the following Equation (8):

$$aA + bB \leftrightarrow cC + dD + ne^{-} \qquad (8)$$

Please replace the current Equation (39) on page 21, line 4 with the following Equation (39):

$$v = 1.3656 + 0.0265\ln(1 + |i|)\mathrm{sgn}(i) + 0.0229\ln(c_d) - 0.0262\ln((1.005*3900 - c_s)/3900) \quad (39)$$

Please amend the paragraph at page 48, line 7 through page 49, line 2 as shown below:

In particular, the SIC 220 receives the damage rate 224, the estimated output signal 216, the estimated internal state signal 218, and a desired performance input signal 226. The signal 226 defines such things as maximum desired power after charging, the time allowed for charging, desired life time performance of the cell and related performance data. These inputs 216, 218, 224 and 226 are processed by the SIC 222 to generate a charging profile signal 228 that is received by the battery charge control 220. The signal 228 effectively uses the desired performance of the cell to modify the input signal 206 generated by the control 220 so as to trade-off performance of cell for the desired purpose of extending the life of the cell. In other words, the battery control system generates the input signal 206 in a manner that is continually updated to provide an optimal charging profile that does the least amount of damage over the life [[o]] <u>of</u> the cell. The performance measure to be minimized is the accumulated damage per

recharge cycle which is exemplified in Equation 85. Accordingly, the algorithm used for the identification of the cell hybrid-model parameters is preferably automated and is expressly set forth in Fig. 12. This allows two things. First, it allows the tracking of parameters as a cell changes during its lifetime. Some knowledge of parameter range could indicate when a cell was nearing failure. Second, it allows the on-line determination of the cell model parameters to begin with, or effectively, the correction of the initial parameters provided to the real-time observer 212. Effectively, the real-time observer 212 could then "learn" any cell. Preferably, the advanced controller 200 also includes models of any damage mechanisms as a function of the system states. And it is believed that degradation algorithms should be included into an observer structure to give a real-time damage indicator for a given cell.